

REMARKS

Applicants respectfully request reconsideration of the rejections of claims 1-2, 4-17, 19-20, and 22-24, including independent claims 1, 11, 16 and 20. Claims 1, 11, 16, and 20 have been amended. Support for these amendments is, for example, provided in paragraphs 20, 29, and 41, and Figures 1 and 2.

In the Office Action, the Examiner rejected claims 1, 2, 4-17, 19, 20, and 22-24 pursuant to 35 U.S.C. § 103(a) as unpatentable over Berger, et al. (US 2004/0015079) in view of Poland, et al. (US 6,537,219).

Independent claim 1 recites an analog-to-digital converter (ADC) between the transducer and the releasable connector where a coaxial cable connects the ultrasound transducer to the analog-to-digital converter and a connector housing connects with the end of the coaxial cable and is at least partially around the releasable connector and the analog-to-digital converter. Berger, et al. and Poland, et al. do not disclose these limitations.

Poland, et al. is cited for multiple multiplexers. Poland, et al. provide transmission mediums 519 and 613 (col. 9, line 19; col. 10, line 55; and Figures 5-6), but do not provide for the ADC positioning relative to the cable and connector housing.

Berger, et al. include the ADC as part of the beamformer (paragraphs 113 and 115). In the embodiment of Figure 3D, a cable 412 is between the probe housing 410 and the interface housing 404, which includes the beamformer 116 (paragraph 204). However, the interface housing 404 is not described as being at least partially around a releasable connector as well as the ADC. The interface housing 404 can be connected with a personal computer using FireWire (see Figure 3D, Figure 6, and paragraph 205), but the location of any releasable connector is not disclosed.

Figures 10-12 show another embodiment. In Figure 10, the cable 494 connected with the array 498 terminates on the other end at the connector 492 (paragraph 219). This connector is for connecting to the interface housing 482, 490 (paragraph 219). Since the

interface housing includes the ADC, the connector 492 does not. Figure 11 shows a similar arrangement as Figure 10, but with less connector and connection detail (see paragraph 220). The embodiments of Figures 10 and 11 do not provide a connector housing, at the end of the cable, for the releasable connector and the ADC.

Figure 12 shows a transducer array probe that may be interchangeably attached to the interface housing 454 (paragraphs 221). Like Figure 10, the beamformer and ADC are in the interface housing, so the ADC is not in a housing connected with the end of the cable that at least partially is around the releasable connector and ADC. The end of the cable connects with a connector for plugging into the interface housing, so the interface housing with the ADC is not a connector housing at the end of the cable.

For clarity, claim 1 is amended to recite that the releasable connector mates with and is releasable from the imaging system housing, and the coaxial cable is non-releasably connected with the connector housing, the connector housing positionable against the imaging system housing when the releasable connector mates with the imaging system housing and when the releasable connector is connected for communicating from the analog-to-digital converter to the ultrasound imaging system, the connector housing having a lesser volume than the imaging system housing. To the extent that the interface housing of Berger, et al. is alleged to be the connector housing, this interface housing is not non-releasably connected with the cable. In the embodiments of Figures 10-12, the connector housing having a lesser volume than the imaging system housing is not provided. The interface housing of Berger, et al. connects with cables to other components and is not positionable against the imaging system housing when the releasable connector mates with the imaging system housing and when the releasable connector is connected for communicating from the analog-to-digital converter to the ultrasound imaging system.

Independent claims 11, 16, and 20 are allowable for similar reasons as claim 1.

Dependent claims 2, 4-10, 12-15, 17, 19 and 22-24 each depend from one of the independent claims above, so is each allowable for at least the same reasons as the corresponding base claim. Further limitations distinguish from the cited references.

Claim 5 recites a fewer number of cables than elements. In the embodiments of Berger, et al. with cables between the elements and the ADC, a fewer number of cables are not provided.

Claim 6 recites a combined signal output as a signal representing an element. Berger, et al. completely beamform, so do not sum to combine signals and output the combined signal as representing an element. Poland, et al. provide beamformation in the probe, so output the beamsum signal as representing a location in the patient.

Claim 7 recites a partial beamformer. Berger, et al. and Poland, et al. use a complete or full beamformer.

Claim 9 recites a switch between the ultrasound transducer and the analog-to-digital converter to bypass analog signals. Berger, et al. and Poland, et al. do not provide an analog bypass.

Claim 10 recites serializers. Berger, et al. provide TX/RX demuxes (paragraph 112) and data packet multiplexing (paragraph 187), but do not disclose serializers.

Claim 13 recites a demultiplexer in the connector housing. Berger, et al. provide a demux for transmit/receive switching to protect receive circuits. Since Berger, et al. provide such circuits prior to the ADC, the demultiplexer is not in the connector housing.

Claim 14 recites a serializer housed by the connector housing. The cited references do not use a serializer.

Claim 17 is allowable for similar reasons as claim 1.

Claim 19 recites partial beamforming, but Berger, et al. and Poland, et al. use full beamforming.

Claim 23 recites demultiplexing the signals after converting and before passing. Berger, et al. demultiplex as part of a transmit/receive switching to protect the receive beamformer circuits, so do not demultiplex after conversion.

CONCLUSION:

Applicants respectfully submit that all of the pending claims are in condition for allowance and seeks early allowance thereof.

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